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The Role of Feedback within Scrum for Engineering Department Operation

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Board 404: The Role of Feedback within Scrum for Engineering Department Operation

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Abstract

Over the past 50 years, there has been little change in how most academic departments in U.S. universities conduct their day-to-day affairs. Many reasons contribute to the lack of innovation in department operations, which includes.

- We have been doing this forever, and it works well, so why change it?

- Is this a high-priority issue that needs attention now?

- Are we being assessed for this? if not, then why bother?

- Change is hard, so why ask for trouble?

The Electrical Engineering and Computer Science Department (EECS) at Embry-Riddle Aeronautical University has been wrestling with the same questions for a while. We recognized that in recent years, many companies have transitioned to using agile processes that have resulted in delivering a higher quality product staying within the schedule and budget. This movement initially started in the software industries, followed by other industries such as automobile, business, and military. This paper discusses the results of integrating the agile methodology, more specifically Scrum, as part of our department's day-to-day operations. Through this process, we identified many advantages, including more efficient generation of better-quality products (e.g., curriculum proposal). We also recognized tangible advantages of using the process, such as continuous feedback on the operation of the department by the stakeholders.

Introduction

Scrum [1 -4] is a framework to facilitate productivity by prioritizing tasks with the highest value and by working in short time increments within a "inspect and adapt" framework. One of the fundamental principles behind the Scrum framework is the integration of the stakeholders (constituents, customers) into the team responsible for developing the project. This integration allows the project requirements to be adjusted during the development process, providing an opportunity to adapt and respond to the needs of the stakeholder in a timely manner. In addition, the regular reviews by customers, and other stakeholders, and the continuous feedback resulting from these reviews improves the quality of the final product.
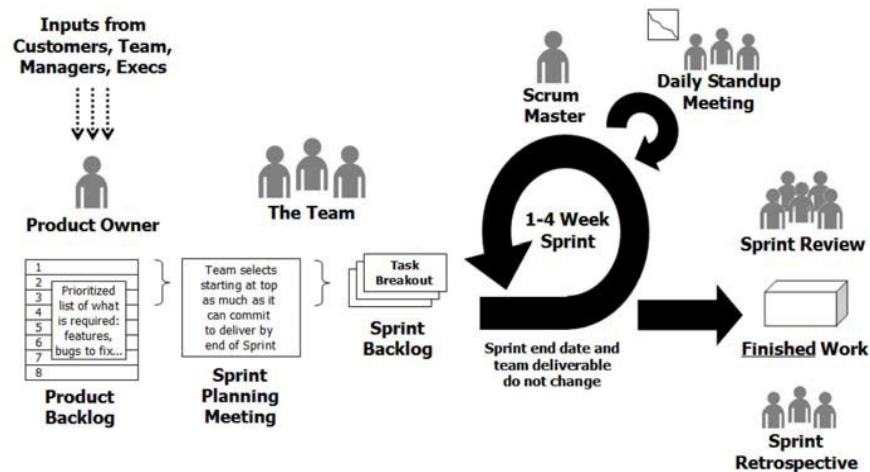
Figure 1. Scrum Process (Sutherland and Schwaber, 2007)

Figure 1 presents the major components of the Scrum framework. In this framework, there are several opportunities for the stakeholders to provide feedback throughout the project development process [5]. The following is the list of these feedback opportunities.

- **Product Backlog and Product Backlog Refinement:** Product backlog is a living document which contains different project stakeholders needs/requirements. Throughout the project the product owner and customer (i.e., stakeholders) meet to find out if there are any new requirements that need to be added and identify the highest priority needs. This process is called product backlog refinement, which is mainly driven by the feedback that is provided by the stakeholders with respect to project requirements.
- **Daily Standup:** Daily standup meetings, or daily scrums, are held to provide a platform for team members to share their progress, challenges, and impediments. This daily feedback loop ensures that issues are identified and addressed promptly, helping the team adapt and make necessary adjustments.
- **Sprint Review:** Scrum teams conduct regular sprint review meetings at the end of each sprint, where they showcase the completed work to stakeholders. This feedback session allows stakeholders to provide input, ask questions, and suggest changes to the product.
- **Sprint Retrospective:** At the end of each sprint, Scrum teams hold sprint retrospectives. During these meetings, team members reflect on what went well, what didn't, and how to improve their processes. This feedback is essential for making continuous improvements and optimizing the team's agility, thereby improving the overall team performance and productivity.

As it is seen continuous involvement of the stakeholders in the product delivery through product backlog, and product backlog refinement results in better defining the product needs and stakeholder's priority. Furthermore, the feedback provided by the stakeholders, which includes

customers and end users, during the sprint review results in the delivery of a better overall product that meets the needs of their constituents.

On the other hand, the feedback that is provided by the development team throughout the product, and implementation reviews the processes that are used to develop and delivery of the product. The implementation reviews take place during the daily standups and sprint retrospectives.

Our Approach

Over the last four years, the Electrical Engineering and Computer Science department have adopted the Scrum framework as a change strategy for the operation of the department. Throughout this time, we have conducted over twenty (20) projects, where the faculty, staff, and students worked together to deliver products that were useful to the department stakeholders. Based on the experience gained through these projects, it was noticed that the integration of the Scrum process not only improved the quality of the products, but also resulted in producing the product in a much shorter time span. We also recognized an increase in faculty, staff and student participation that resulted in an increased sense of belonging for the project participants. Finally, the importance of the feedback through product backlog refinement, daily standups, sprint reviews, and sprint retrospectives, has resulted in the delivery of a better product, and improved team performance. An additional side effect of this feedback was the breakdown of the departmental and social hierarchies built into the academic environment. For example, through the feedback, the junior faculty felt more empowered to contribute to these discussions while in the presence of more senior faculty, and in the same way the student participants felt empowered to contribute to the discussions in the presence of the faculty.

The following table illustrates the observed role of feedback within two Scrum teams, one focused on student success and the other focused on faculty rewards and incentives. As the name implies, the "student success" team goal is to identify activities and opportunities inside and outside the classroom to improve the student's success, which includes student's retention, grade improvement, better job placement, and graduate school enrolment. The faculty rewards and incentives team goal is to identify opportunities that encourage faculty to participate in the Scrum teams, and to recognize that participation as part of their workload and overall contributions to the department.

Table 1. Role of feedback in Scrum Framework

Feedback\Project	Student Success	Faculty Rewards and Incentives
Feedback Instruments	- Sense of belonging survey - Student Interviews - Classroom observations - Stakeholder feedback	- Faculty Interview - Organization Culture Assessment Instrument (OCAI) Survey - User Type Survey - Implementation team feedback

Product Backlog Refinement	Team initially concentrated on Asset-Based Culture, however due to the stakeholders' feedback; the team recognized that the sense of belonging has a higher priority. This is since COVID forced the transition to online classroom from the face-to-face meeting	Team initially was tasked with the integration of the Scrum practices throughout the department daily operation. However, it became obvious that to accomplish this task, faculty contributions need to be recognized and awarded. An example was the recognition of their contribution to the Scrum team during the promotion and tenure process
Daily Standup	Identification of the literature that better define Asset-Based Culture and Sense of Belonging, and learning about the current state of research	Better clarify the roles and responsibilities, and match the awards and recognitions based on the effort that is needed to perform those roles/tasks
Sprint Review	As part of one of their earlier sprints reviews, the team recognized that they need to involve educational expert as part of their stakeholders. They asked the representative from the Center for Teaching and Learning Excellence (CTLE) to serve as a permanent member of the team	Identification of opportunities for the recognition of faculty participations, through monetary awards, or other forms or recognition such as department/college faculty service awards
Sprint Retrospectives	Need to span the stakeholders by including graduate and undergraduate students to participate in the reviews, with more frequent feedback using additional instruments	Refine estimation and time allocations for tasks. For example, faculty availability to project contributions is significantly decreased during the start of the semester, and final exams

Concluding Remarks

The Scrum framework is built on the principles of inspection and adaptation as a mechanism for continuous process improvement. Feedback drives the inspection process, and the team adapts based on that feedback to optimize its performance and outcomes. Within engineering departments, Scrum requires departments to examine how and when feedback is obtained to ensure that the department remains agile. This poster illustrates the role of feedback within two Scrum teams, one focused on student success and the other focused on faculty rewards and incentives. The two cases emphasize the need for continuous introspection at team and department levels.

Acknowledgement

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